Three years' contribution to the discontinuous permafrost observations in Alaska

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The land surface and subsurface processes and their complex interactions are of great importance to improve the performance of Earth System Models in cold regions in the high-latitude regions. The in-situ observations for the climate conditions and ground thermal regime are especially important for cold regions ecosystems where topography, permafrost, hydrology, vegetation, and biogeochemistry are inextricably linked. The implications of such linkages include permafrost thaw and deepening of the active layer, changing productivity, and watershed-scale changes in ground surface. In order to detect the response of discontinuous permafrost to the drastic warming in the Arctic regions, in September of 2018, an integrated automatic weather station was set up through collaboration of SKLCS and IARC at Teller site of Nome, Alaska. At the same time, the active layer monitoring site to measure soil temperatures at five levels has been deployed. Until the September of 2021, the air temperature, the ground surface temperature, and soil temperature data have been collected for a whole freezing-thawing period for three years. In this study, the ground surface freezing-thawing condition has been analyzed to identify the different impact factors of meteorological and local parameters. The result will enhance our understanding the energy and water exchange mechanism between atmosphere and ground surface in the discontinuous permafrost regions. The observations will be expected to make contribution to the existed permafrost observation network in this region.

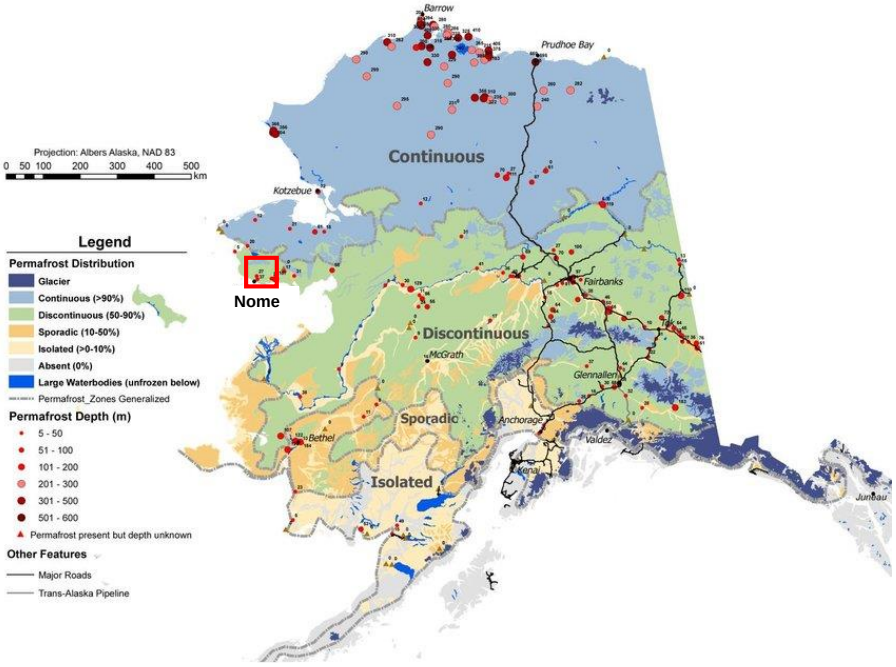

Figure 1. The location of permafrost observation sites in discontinuous permafrost regions of Alaska